

# ***OSTEOCEPHALUS PLANICEPS* COPE (AMPHIBIA: HYLIDAE): ITS DISTRIBUTION IN COLOMBIA AND SIGNIFICANCE**

by

**John D. Lynch<sup>1</sup>**

## **Resumen**

**Lynch, J. D.:** *Osteocephalus planiceps* Cope (Amphibia: Hylidae): Its distribution in Colombia and significance. Rev. Acad. Colomb. Cienc. **32**(122): 87-91, 2008. ISSN 0370-3908.

Existen tres hipótesis biogeográficas que se aplican para los bosques de tierras bajas al oriente de los Andes colombianos y los datos de la distribución de *Osteocephalus planiceps* no coinciden. Existen otros datos para la distribución de una rana arborícola (*Hypsiboas hutchinsi*) que sí lo están para una pero no para las otras dos. Las tres hipótesis requieren estudios serios para determinar que al menos una es consistente con los datos que se obtienen en las bases de datos disponibles en los museos colombianos.

**Palabras clave:** Anuros, biogeografía, Cuenca Amazónica, evidencia.

## **Abstract**

Three biogeographic hypotheses are available for the forested lowlands of eastern Colombia and the distributional data for *Osteocephalus planiceps* are contrary to each hypothesis. The distributional data for another uncommon treefrog (*Hypsiboas hutchinsi*) are acceptable for one of the three hypotheses but not the other two. These biogeographic hypotheses require serious study to decide if any one of them is consistent with a rich database available in Colombian museums.

**Key words:** Amazonian basin, Anurans, biogeography, evidence.

<sup>1</sup> Grupo de Cladística profunda y biogeografía histórica, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá. Correo electrónico: jdlynch@unal.edu.co

The treefrog genus *Osteocephalus* is particularly diverse in Colombia (preserved Colombian vouchers are available in the amphibian collection of the Instituto de Ciencias Naturales for *O. buckleyi*, *O. cabrerai*, *O. carri*, *O. deridens*, *O. heyeri*, *O. mutabor*, *O. oophagus*, *O. planiceps*, *O. taurinus*, *O. verruciger*, and *O. yasuni*) and all known species are distributed east of the Andes (Acosta, 2000). Most of these are large frogs and apparently pass much of the year as residents of the canopy but descending to ground level to breed (personal observation and assumption). The species *O. planiceps* was described in the 19<sup>th</sup> century (Cope, 1874) and was relegated to the synonymy of *O. taurinus* by Trueb & Duellman (1971). During its century of recognition, it was but another name applied to hylid frogs from the Amazon Basin. Cochran & Goin (1970) did not include *O. planiceps* as part of the Colombian frog fauna.

Duellman & Mendelsohn (1995), based on study of material in northern Peru, drew conclusions sharply at odds with Trueb & Duellman (1971) and proposed that *O. planiceps* was one of the species found in the rainforests of Departamento Loreto in Peru. Duellman & Mendelsohn (1995) provided a partial diagnosis and distinguished *O. planiceps* from other species found in northern Amazonian Peru. The only report of *O. planiceps* from Colombia was by Lynch (2005) who included the name in the list of species collected in the forests some 7-15 kilometers north of the city of Leticia.

There are, at present, three competing proposals masquerading under the term biogeography for the rainforests of eastern Colombia. Hernández *et al.* (1992) proposed a series of biogeographic provinces and districts for the entire country. In terms of the forested eastern lowlands, they recognized two Provinces (La Guayana and La Amazonia-divided by the route of the Río Yarí and lower Río Caquetá) with six Districts south of the Río Guaviare (Fig. 1C). The proposal of Hernández *et al.* (1992) is hierarchical (districts are subdivisions of provinces). A very different proposal is that of Morrone (2000) whose treatment of southeastern Colombia included three subregions (Fig. 1B), whose boundaries do not correspond with any of the entities proposed by Hernández *et al.* (1992). In Morrone's proposal, there is a subregion associated with larger rivers (the floodplain [or inundated] forests) and southeastern Colombia is otherwise divided into a western fragment (Napan) and eastern fragment (Imerí) that join along the western edge of the Parque Nacional Chiribiquete. The third proposal is that of Fandiño & Wyngaarden (2005) who present a non-hierarchical proposal recognizing 63 chorological types; for lowland

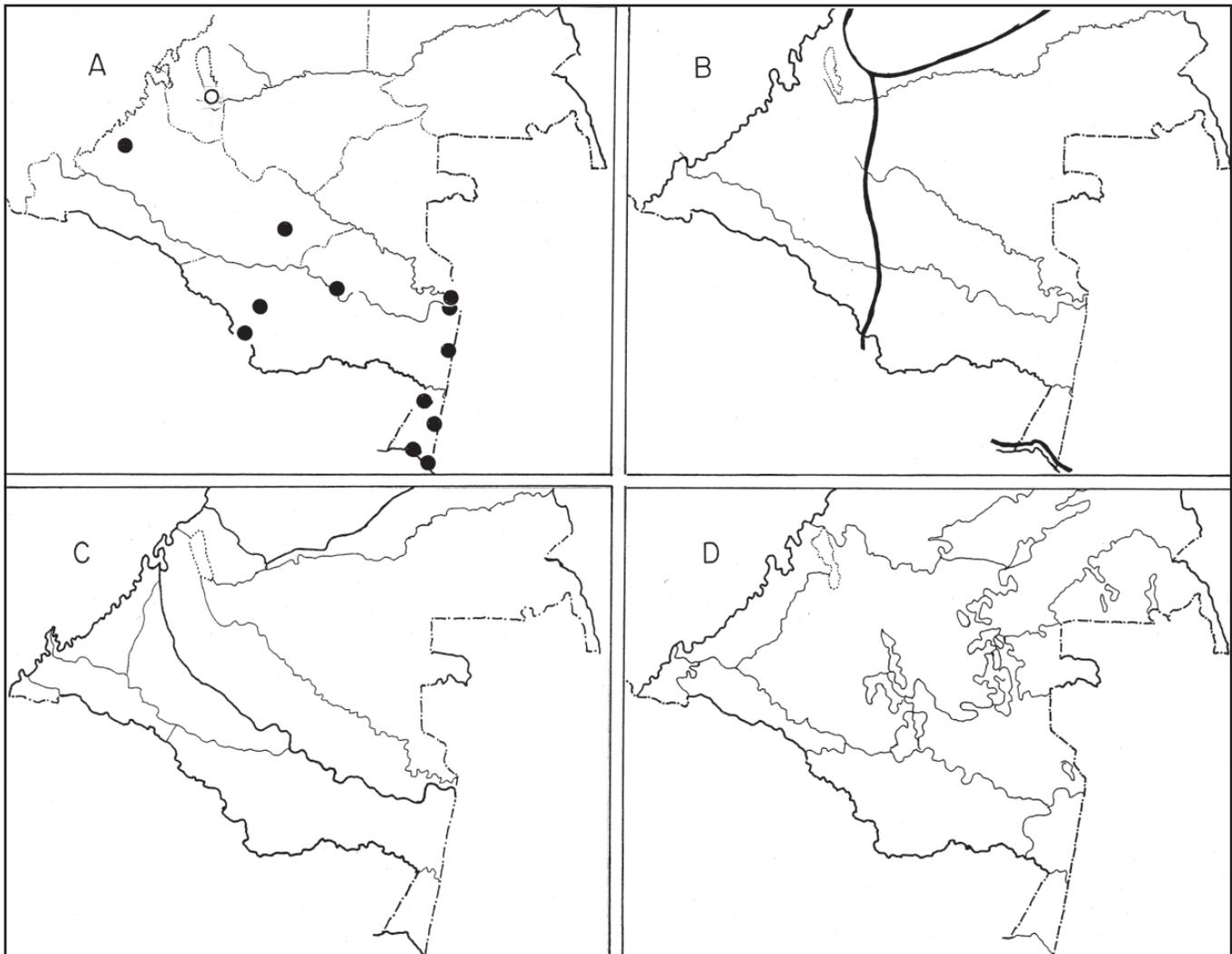
Colombia south of the Río Guaviare, there are 13 units (Fig. 1D). The chorological types of Fandiño & Wyngaarden (2005) bear considerable resemblance to the districts of Hernández *et al.* (1992) because each proposal makes abundant use of river courses in order to define boundaries and each treats political borders as something real. In contrast, the proposal of Morrone (2000) ignores political boundaries. Although the proposals of Hernández *et al.* (1992) and Morrone (2000) are each hierarchical, the hierarchical aspect of the proposal of Morrone is for regions outside of the focus of this article.

Of the three proposals, only that of Morrone (2000) makes any effort to include biological data in the form of distributions of organisms as part of a justification for a biogeographic entity. Morrone's methodology requires that the panbiogeographic track of at least one species conform to the limits of a biogeographic entity (in his case, a subregion). For the other two proposals, the areas were identified without recourse to biological data. In that case, one cannot help but wonder why the authors considered these units to be "biogeographical" (in the European tradition, the term is chorological).

With Platnick (1991), I would argue that recognition of some area in terms of biogeography requires at least a single coincidence. That coincidence is defined as a minimum of two biological distributions, each of which defines the same area. Morrone's (2000) reliance upon a single endemic species (endemic to one of his subregions) does not generate anything that might be recognized as a pattern.

Considering amphibian species, I know of no pair of species that conforms to any of Hernández *et al.* (1992) "biogeographic" districts or to Fandiño & Wyngaarden's (2005) chorological types (however, including reptiles as well, tc 62 [Isla Malpelo] can be sustained with evidence). These generally small districts or chorological types are perhaps appropriate for Andean species because, at least for amphibians, Andean distributions are small whereas in the lowlands, the distributions are much more extensive (Lynch & Duellman, 1997). Assuming that Morrone has at least one species' distribution that conforms to each of his subregions, the relevant question is: Are there more?

Borrowing a famous phrase, or quote, from Charles Darwin, concerning that evidence is either for or against a particular hypothesis (taken from a letter by Darwin to Asa Gray in 1857, Ghiselin, 1969), the data from biological distributions, imperfect though they may be, are pertinent to the acceptance or rejection of specific scientific proposals (curiously, also a quote from his less-famous co-discoverer of evolution, Alfred Wallace [see Brooks,



**Figure 1.** (A) Distribution of *Osteocephalus planiceps* in Colombia (solid symbols: voucher records housed in ICN; open symbol: record based on photograph). (B) biogeographic proposal of **Morrone** (2000); (C) biogeographic proposal of **Hernández et al.** (1992); (D) biogeographic proposal of **Fandiño & Wyngaarden** (2005).

1984: 10, quoting a letter from A. Wallace to Henry Bates, written 28 December 1845]).

### The distribution of *Osteocephalus planiceps* in Colombia

In the collections of the Instituto de Ciencias Naturales, there are preserved vouchers for *O. planiceps* from 11 localities in the Departamentos de Amazonas, Caquetá and Vaupés (Fig. 1A). The absence of vouchers from Depto. Putumayo is probably the result of the lack of serious inventory work in the lowlands of Putumayo when our focus is upon a frog species that normally occupies the canopy.

Beyond the documented vouchers, I have a photograph of *O. planiceps* from the southern edge of the Serranía de la Macarena in Depto. Meta.

The data for the distribution of *O. planiceps* do not support any of the three proposals (and are contrary to each proposal). Given that neither the **Hernández et al.** (1992) nor the **Fandiño & Wyngaarden** (2005) proposal has the minimum quantity of data to support any of their “biogeographical” entities, the negative data for *O. planiceps* assume greater importance. If the **Morrone** proposal has minimal data to support its three “biogeographical” subregions, a species with a wide-spread

distribution (*O. planiceps*) does not count as counter-evidence (Nelson & Platnick, 1981).

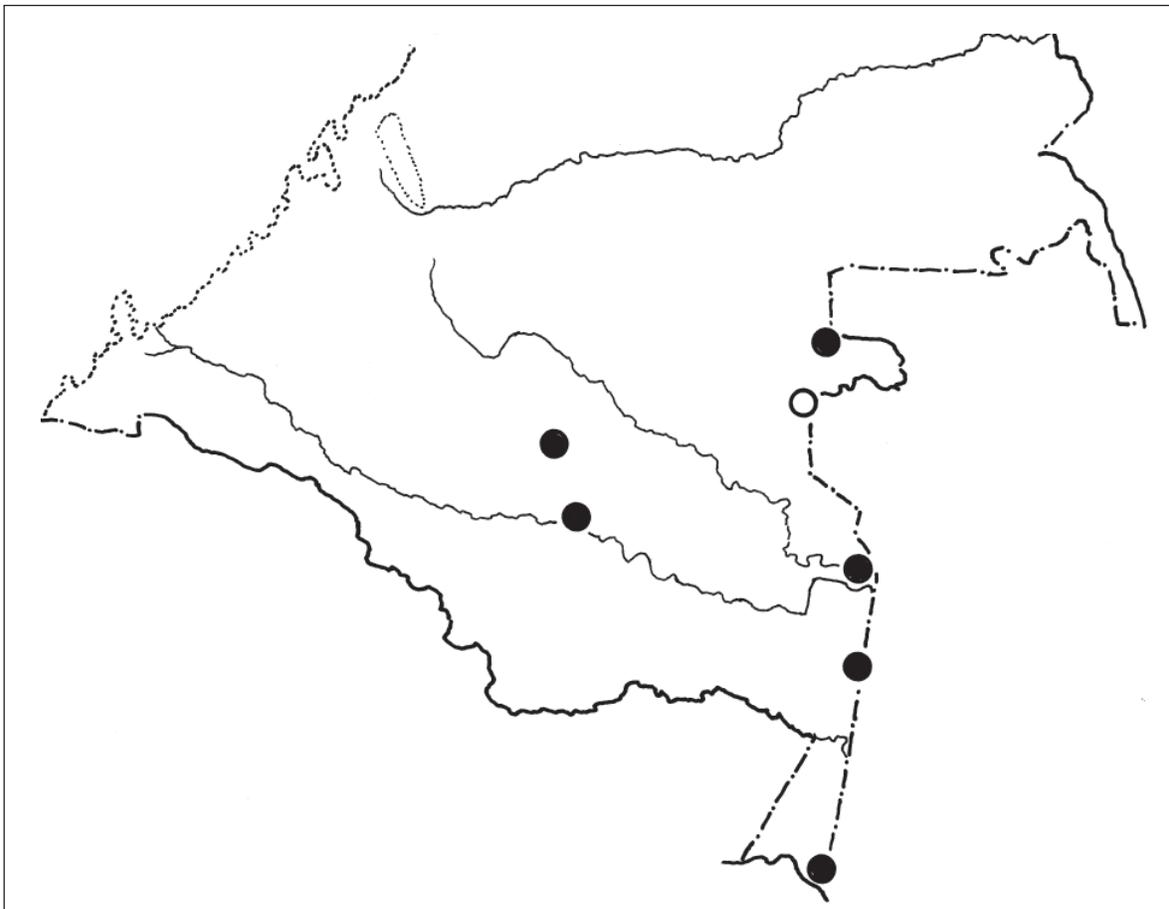
Another treefrog described from southeastern Colombia [*Hypsiboas hutchinsi* (Pyburn & Hall)] offers data (Fig. 2) that are consistent with Morrone's (2000) proposal and at the same time serve to reject the proposals of Hernández *et al.* (1992) and Fandiño & Wyngaarden (2005). *Hypsiboas hutchinsi* is known only from Colombia (Deptos. de Amazonas, Caquetá, and Vaupés) and adjacent Brasil. The southernmost records lie within the upland forests and do not include localities within the *varzea* (recognized as a different subregion by Morrone, 2000).

### Discussion

Given that few investigators have developed arguments pertinent to biogeographic hypotheses, the pertinence of

the data for *O. planiceps* remains ambiguous. As a first approximation, it is sufficient to raise serious doubts as to the degree to which any of these biogeographic hypotheses merits even tentative acceptance. The data for *Hypsiboas hutchinsi* are equally negative for the hypotheses of Hernández *et al.* (1992) and Fandiño & Wyngaarden (2005). These observations do not support (nor deny) the possibility that a robust hypothesis awaits articulation. What remains for the immediate future is to put each of these three hypotheses to as severe testing as available data permit.

The minimal data for the distribution of *O. planiceps* are fatal for the proposal of Morrone (2000) and for that of Hernández *et al.* (1992). Neither author (or set of authors) imagined that this species existed. *Hypsiboas hutchinsi* (Fig. 2) is acceptable to the proposal of Morrone (2000) but not for the provincial proposal of Hernández *et al.* (1992).



**Figure 2.** Known distribution of *Hypsiboas hutchinsi*. Open symbol (record of Pyburn & Hall, 1984). Solid symbols represent vouchers in the ICN.

We return to the, surely independent, assertions of A. Wallace (in **Brooks**, 1984) and C. Darwin (in **Ghiselin**, 1969) that, every fact (=species) is either for or against a particular hypothesis. Are the museum records of *Hypsiboas hutchinsi* and *Osteocephalus planiceps* sufficient to require re-thinking of biogeographic proposals? I think that the answer is yes. We still need to understand the pattern of organic distributions in eastern Colombia.

### Literature cited

- Acosta, A. R.** 2000. Ranas, salamandras y caecilias (Tetrapoda: Amphibia) de Colombia. *Biota Colombiana* **1**: 289-319.
- Brooks, J. L.** 1984. Just Before The Origen/ Alfred Russel Wallace's Theory of Evolution. Columbia University Press, New York. 284 pp.
- Cochran, D. M. & C. J. Goin.** 1970. Frogs of Colombia. United States National Museum Bulletin (288): 1-655.
- Cope, E. D.** 1874. On some Batrachia and Nematognathi brought from the upper Amazon by Prof. Orton. Proceedings of the Academy of Natural Sciences of Philadelphia **25**: 120-137.
- Duellman, W. E. & J. R. Mendelsohn III.** 1995. Amphibians and reptiles from northern Departamento Loreto, Peru: taxonomy and biogeography. The University of Kansas Science Bulletin **55**: 329-376.
- Fandiño Lozano, M. & W. van Wyngaarden.** 2005. Prioridades de Conservación Biológica para Colombia. Grupo ARCO, Bogotá. 188 pp.
- Ghiselin, M. T.** 1969. The Triumph of the Darwinian Method. University of California Press, Berkeley. 287 pp.
- Hernández Camacho, J. I., A. H. Guerra, R. O. Quijano & T. Walschburger.** 1992. Unidades biogeográficas de Colombia. Pp. 105-151, *En* G. Halffter (ed.) La Diversidad Biológica de Iberoamérica. Acta Zoológica Mexicana (n.s.). 389 pp.
- Lynch, J. D.** 2005. Discovery of the richest frog fauna in the world—an exploration of the forests to the north of Leticia. *Rev. Acad. Colomb. Cienc. Ex. Fís. Nat.* **29**: 581-588.
- Lynch, J. D. & W. E. Duellman.** 1997. Frogs of the Genus *Eleutherodactylus* (Leptodactylidae) in Western Ecuador: Systematics, Ecology, and Biogeography. Natural History Museum, the University of Kansas, Special Publication (23): 1-236.
- Morrone, J. J.** 2000. A new regional biogeography of the Amazonian subregion, mainly based on animal taxa. *Anales del Instituto de Biología Universidad Nacional Autónoma de México, ser. Zoolología* **71** (2): 99-123.
- Nelson, G. & N. Platnick.** 1981. Systematics and Biogeography/ Cladistics and Vicariance. Columbia University Press, New York. 567 pp.
- Platnick, N. I.** 1991. On areas of endemism, 2 pp (unnumbered), *In* P. Y. Ladiges, C. J. Humphries & L. W. Martinelli. *Austral Biogeography. Australian Systematic Botany* **4**. CSIRO Press, Australia. 120 pp.
- Pyburn, W. F. & D. H. Hall.** 1984. A new stream-inhabiting treefrog (Anura: Hylidae) from southeastern Colombia. *Herpetologica* **40**: 366-372.
- Trueb, L. & W. E. Duellman.** 1971. A synopsis of Neotropical hylid frogs, genus *Osteocephalus*. Occasional Papers of the Museum of Natural History/ the University of Kansas/ Lawrence, Kansas (1): 1-47.

Recibido: julio 24 de 2007

Aceptado para su publicación: abril 18 de 2008